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BUFFER MATERIAL MADE OF PAPER

[Kamisei Kanshozai]

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/1[1]

Specification

1. Title of the invention

BUFFER MATERIAL MADE OF PAPER

2. Claims /2

1. A buffer material made of a paper, characterized by the fact that a twisted string with coarse cavities is formed between twists by lightly twisting one or several strip-shaped papers; said twisted string are cross-braided in a net shape; and a number of windows are formed between the cross braids.

2. The buffer material made of a paper of Claim 1, characterized by the fact that the above-mentioned strip-shaped paper is overlapped and folded in the transverse direction via a folded line in the longitudinal direction.

3. The buffer material made of a paper of Claim 1 or 2, characterized by the fact that a knitted net shape is formed by the above-mentioned cross braiding.

4. The buffer material made of a paper of Claim 1 or 2, characterized by the fact that the cross parts of the above-

[1] Numbers in the margin indicate pagination in the foreign text.

mentioned cross-braided twisted strings are adhered via an adhesive.

5. The buffer material made of a paper of any of Claims 1-4, characterized by the fact that a quality retainer such as antibacterial agent and antimold agent for holding the quality of a product being buffered is given to the above-mentioned twisted string.

3. Detailed explanation of the invention

[0001]

(Technical field of the invention)

The present invention pertains to a buffer material made of a paper for packing.

[0002]

(Prior art)

As the representative examples of conventional buffer materials for packing, plastic foamed body, polyethylene film having a number of air projections, etc., are used.

[0003] Also, as a buffer material for packing made of a paper, a corrugated cardboard is generally used, and in addition to that, crape paper, embossed paper, etc., are used.

[0004]

(Problems to be solved by the invention)

However, though the above-mentioned plastic foamed body, etc., are lightweight, have excellent buffer effect, and are frequently used, they are deficient in the fitness to packages and must be molded into a shape suitable for the packages, and the external shape is excessive.

[0005] In addition, since they cause a pollution or environmental pollution in its disposal treatment or burning treatment, the conversion into a buffer material made of a paper with easy treatment and little environmental pollution is considered.

[0006] However, the above-mentioned corrugated cardboard being frequently used as a conventional buffer material made of paper has a high impact resistance strength and an excellent buffer effect, while the fitness to packages is deficient. In addition, the cost is relatively high, and wood resources cannot be saved.

[0007] Furthermore, the other buffer materials made of papers such as crape material and embossed paper are generally deficient in the impact resistance strength and inferior in the buffer effect against a heavy impact.

[0008] Then, since the present invention has a relatively large impact resistance strength, it can be widely utilized as a buffer material against to a heavy impact to a light impact, and a good fitness and an excellent buffer effect can be exerted for packages. At the same time, the buffer material can be inexpensively produced with a small amount of paper material being used, and a resource-saving type buffer material made of a paper which can be recycled as an old paper pulp is provided.

[0009]

(Means to solve the problems)

In the buffer material made of a paper, a twisted string with coarse cavities is formed between twists by lightly twisting one or several strip-shaped papers, the twisted strings are cross-braided in a net shape, and a number of windows are formed between the cross braids.

[0010] In the above-mentioned twisted string, horizontal twisted strings (or left inclined twisted strings) and vertical twisted strings (or right inclined twisted strings) are simply vertically overlapped and cross-braided or knitted and cross-braided so that the twisted strings of the former and the latter may be the top and bottom in an alternate fashion.

[0011] The cross parts of the above-mentioned cross-braided twisted strings are adhered via an adhesive.

[0012] Also, as the above-mentioned strip-shaped paper, a relative wide paper is used, and it is overlapped and folded in the transverse direction via a folded line in the longitudinal direction and subjected to the above-mentioned twisting. Thus, a sufficient thickness of the twisted string is secured, and the degree of cavity is increased.

[0013] Also, two sheets or more of the above-mentioned strip-shaped papers are overlapped in the longitudinal direction and subjected to the above-mentioned twisting, so that the above-mentioned thickness and degree of cavity can be secured. At that time, with the adoption of a constitution in which folding in the above-mentioned transverse direction is applied and twisting is given, the buffer effect is further improved. The above-mentioned thickness and degree of cavity can be freely set by the selection of the width of the strip-shaped paper and the number of sheet and the folding.

[0014]

(Embodiment of the invention)

The above-mentioned strip-shaped paper is selected in a range of Tsubo of 15-50 g/m^2 and has a paper width in a range of 15-200 mm in the transverse direction, and light twisting and compression of 2-10 times are applied at a length of 300 mm to the strip-shaped paper, so that a twisted string 2 in which

coarse cavities 2′ are overlapped between the twists (string inside) is formed.

[0015] Next, the twisted strings 2 are cross-braided to form a netted sheet 4, and a number of windows 3 whose one side has a thickness of 5-100 mm are formed between said cross braids.

[0016] In the twisted string 1, as shown in Figure 5, while passing the strip-shaped paper 1 of Figures 1A, 1B, and 1C through a string passage unit 6 having a through hole, the strip-shaped paper 1 is rotated round the axial line at the inlet. Thus, the twisted string 2 with a diameter of the hole of the string passage unit 6 can be obtained from the outlet of the string passage unit 6. Therefore, the twisted string 2 has a specific structure in which the strip-shaped paper 1 is twisted while compressing in a centripetal direction and is a multilayered body having a complicated internal overlapping, and the twisted string has coarse cavities 2′ in the longitudinal direction formed between the layers by twisting and compressing.

[0017] Also, the above-mentioned strip-shaped paper 1 is the twisted string 2 as shown in Figure 1A, or a relatively wide strip-shaped paper is folded in the transverse direction via a folded line in the longitudinal direction and subjected to the above-mentioned twisting and compressing as shown in Figure 1B.

Thus, a sufficient thickness of the twisted string is secured, and the degree of cavity is increased.

[0018] Also, as shown in Figure 1C, two sheets or more of the above-mentioned strip-shaped papers 1 are overlapped in the /3 longitudinal direction and subjected to the above-mentioned twisting, so that the above-mentioned thickness and degree of cavity can be secured. At that time, with the adoption of a constitution in which folding in the above-mentioned transverse direction is applied and twisting and compressing are given, the buffer effect is further improved. The above-mentioned thickness and degree of cavity can be freely set by selecting the width of the strip-shaped paper 1, the number of sheet, and the folding. The Tsubo of the above-mentioned strip-shaped paper 1 is 30-40 g/m^2, the paper width is about 30-130 mm, and the number of twist is most favorably about 5-8 times at a length of 300 mm.

[0019] As a pattern in which the above-mentioned twisted strings 2 are cross-braided to form a net shape, as shown in Figures 3A and B, a method that cross-braids the twisted strings 2 at about a right angle is adopted. In other words, twisted strings 2a in the horizontal direction and twisted strings 2b in the vertical direction are crossed at about a right angle in a net shape, so

that a sheet 4 having a number of radial windows 3 between the cross braids is formed.

[0020] Also, as another example, as shown in Figure 3C, a method that cross-braids the twisted strings 2 at an angle of inclination is adopted. In other words, left inclined twisted strings 2c and right inclined twisted strings 2d are crossed in a net shape so that one diagonal may be 90° or less and the other diagonal may be 90° or more. Thus, the netted sheet 4 having a number of diamond-shaped window 3 between the cross braids is formed.

[0021] Furthermore, the above-mentioned net-shaped sheet 4 shown in Figures 3A, B, and C has a knitted structure as shown in Figures 3A and B or has a non-knitted structure as shown in Figure 3C.

[0022] In other words, the horizontal twisted strings 2a (or left inclined twisted strings 2c) and the vertical twisted strings 2b (or right inclined twisted strings 2d) are knitted and cross-braided so that they may be the top and bottom in an alternate fashion, or as shown in Figure 3C, the horizontal twisted strings 2a (or left inclined twisted strings 2c) and the vertical twisted strings 2b (or right inclined twisted strings 2d) are vertically overlapped and cross-braided so that one of

them may be an upper position and the other may be a lower position.

[0023] In the above-mentioned knitted or non-knitted sheet 4, as shown in Figures 4A and B, one twisted strings 2a and 2c and the other twisted strings 2b and 2d are adhered at its cross parts via an adhesive 5, so that the shift of the twisted strings is prevented and the net-shaped body is held.

[0024] In case the twisted strings 2a, 2b, and 2c, 2d as shown in Figures 3A and 3C are knitted as shown in Figure 3A, the above-mentioned cross parts are not adhered at all, and the cross parts are held only by the knitted braiding. Also, in case the twisted strings are adhered, limited necessary cross parts are adhered.

[0025] In case the above-mentioned twisted strings 2a, 2b or 2c, 2d are knitted, as shown in Figure 4, since pressure-receiving points P being vertically protruded to the cross parts are formed, and the pressure-receiving points P are uniformly arranged and contact with a non-buffer product, so that an effective buffer effect can be obtained.

[0026] Also, in case the twisted strings 2a, 2b or 2c, 2d are vertically overlapped and crossed in a net shape as shown in Figure 3C, the adhesion at the above-mentioned cross parts is essential. In this case, at least two or more cross parts for

each twisted string are also adhered, and limited necessary cross parts are adhered.

[0027] In the above-mentioned twisted strings 2, a paper strength reinforcing material can be included to give an impact or tensile strength. For example, the paper strength reinforcing material is used in making a raw paper.

[0028] Also, in order to raise the packing effect for raw fish products, drugs for holding the quality such as antibacterial agent, antimold agent, and freshness holding agent can be selected and held in the above-mentioned twisted string 2. These drugs for holding the quality are internally added to a raw paper-making slurry or twisted into between the twists during the formation of the above-mentioned twisted string 2. Also, they can be held by spreading or impregnating.

[0029] Also, in order to hold the quality of a product made of a metal being buffered, an antirust agent can be held in the above-mentioned twisted string 2.

[0030] Since the buffer material has the above-mentioned twisted string structure, the above-mentioned paper strength reinforcing agent and the quality retainer easily hold an appropriate amount by an appropriate retention force.

[0031] The above-mentioned strip-shaped paper is made of natural fibers (pulps), or synthetic fibers such as synthetic resin fibers can be mixed with it.

[0032] The above-mentioned netted sheet 4 is provided in a flat sheet shape as a buffer material or provided in tubular shape, bag shape, etc., as a buffer material, warps a material being buffered or packs it by being filled into the periphery, placed, or overlapped.

[0033] Also, two sheets or more of the netted sheets 4 shown in Figures 3A, B, and C are overlapped and adhered in necessary portions, so that a buffer material with a multilayered structure is attained.

[0034] Application Example 1

Nadelholz unbleached Kraft pulp

30 parts NUKP, 30 parts LUKP, and 60 parts color high-quality old paper 6 as raw materials of a buffer material were mixed and prepared at the degree of beating of 30° SR, so that a raw paper with a Tsubo of 37 g/m^2 was made as a circular netted paper. These raw papers were slit at a width of 130 mm by a bobbin machine. It was sent to a twisting machine and wound up in a twisted string shape. At that time, the diameter of the twisted strings is 6-8 mm.

[0035] These twisted strings were sent to a weaving machine, so that a knitted netted sheet with a vertical twisted string

interval of 15 mm and a horizontal interval of 15 mm (vertically 6 pieces, horizontally 6 pieces in 100 x 100 mm^2, 530 g per 1 m^2) was manufactured.

[0036] Also, a knitted netted sheet with a vertical twisted string interval of 25 mm and a horizontal interval of 25 mm (vertically 4 pieces, horizontally 4 pieces in 100 x 100 mm^2, 322 g per 1 m^2) was manufactured. When they were actually used as packing buffer materials of machine parts and a transport test was repeated, it was recognized that the parts were not damaged at all and the buffer materials were appropriate.

[0037] Application Example 2

A soft paper was made of 100% LBKP pulp, and similarly to Application Example 1, a twisted string was manufactured, and an infinitesimal amount of antibacterial agent and antimold agent was spread (1.5-3 wt%) using a spray gun during the manufacture. The twisted string with a diameter of 5 mm was sent to the weaving machine, so that a knitted netted sheet with a horizontal twisted string interval of 20 mm and a vertical interval of 20 was attained. It was used for packing vegetables and fruits, and the change state with a lapse of day was investigated, compared with a netted sheet in which these drugs were not held. As a result, distinct antimold and antibacterial effects were recognized. /4

[0038]

(Effects of the invention)

The buffer material of the present invention has large impact resistance strength, excellent buffer effect, and good fitness to products being packed (materials being buffered) and can be widely applied as a buffer material to various kinds of products being buffered. The above-mentioned effects result from the multiplication of various kinds of elements such as the twisted structure using the rigidity unique to a paper, the flexibility of the twisted strings, the cavities between the twists, the linear support and the pressure-receiving support formed at the cross parts by the netted shape, and the existence of a number of windows.

[0039] Also, several sheets of netted sheets 4 are simply overlapped and pack a material being buffered, so that the degree of cavity is considerably increased between the overlapped sheets in addition to the overlapping of the cavities in the strings, so that that the buffer effect is accelerated.

[0040] Also, the burning treatment is easy, a good buffer effect can be obtained with a low paper material consumption, and the buffer material can be recycled as a raw paper material, so that the buffer material is effective as a resource-saving type buffer material. Also, the manufacture cost is low, the buffer

material is not bulky during the storage and transport, and when it is in use, a large buffer effect is obtained by a relatively compact packing.

[0041] Also, using the twisted string structure, a sufficient amount of quality retainer, antirust agent, paper strength reinforcing agent, etc., can be stably held.

4. Brief description of the figures

Figure 1 is a plan view showing part of a strip-shaped paper, B is an oblique view showing part of a folded strip-shaped paper, and C is an oblique view showing a state in which several sheets of strip-shaped papers are overlapped.

Figure 2 is an enlarged oblique view showing part of the twisted string formed by twisting the above-mentioned strip-shaped papers of Figures 1A, B, and C.

Figure 3 is an oblique view showing the main parts of a netted sheet in which the twisted strings are crossed at about a right angle and knitted, B is its plan view, and C is a plan view showing the main parts of a netted sheet in which the twisted strings are obliquely cross-braided.

Figure 4A is a cross section showing the main parts of the above-mentioned netted sheet of Figure 3, and B is a cross section showing the main parts of the netted sheet of Figure 3C.

Figure 5 is an outlined side view for explaining a method for forming a twisted string.

Explanation of symbols:

1 Strip-shaped paper

2 Twisted string

2′ Coarse cavity

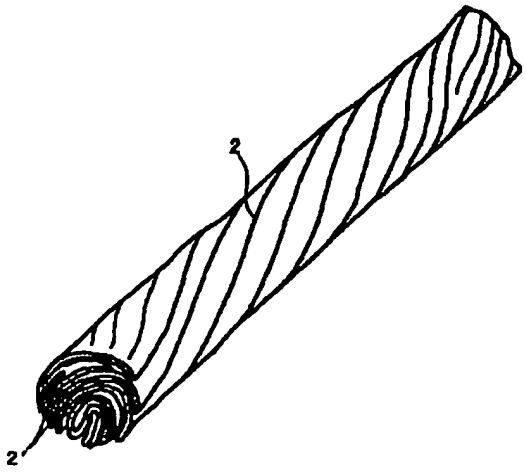
3 Window

4 Netted sheet

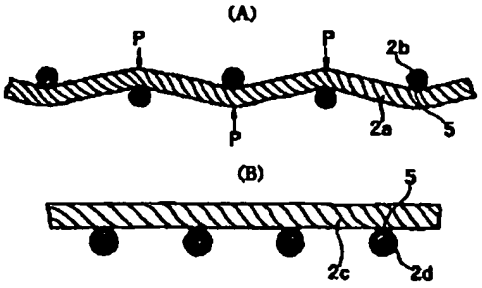
5 Adhesive

P Pressure-receiving point

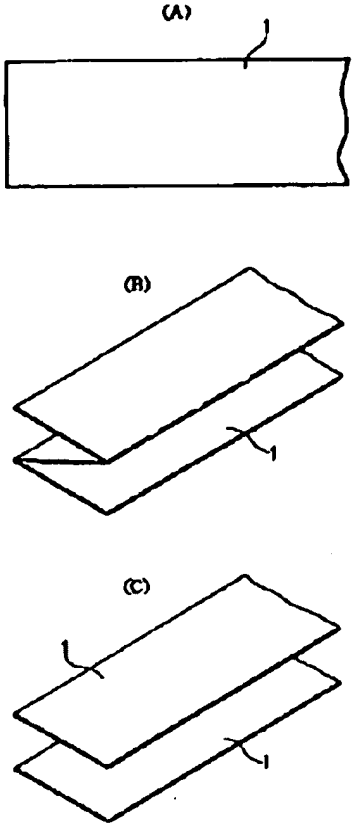
【図2】



【図4】



【図1】



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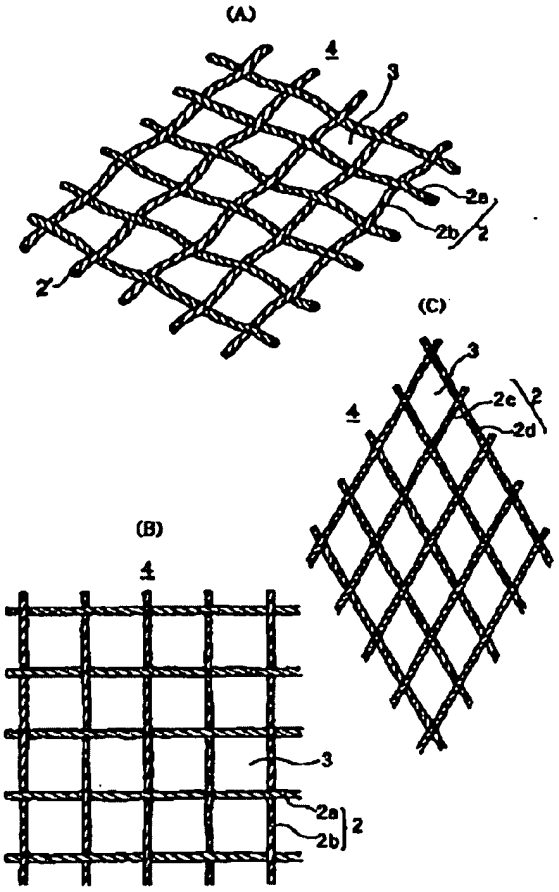

【図5】